

Chemistry HP Final Review Problem

Methane (CH_4) reacts with ammonia (NH_3) and oxygen to produce hydrocyanic acid and water.

(a) Write a balanced chemical for this reaction.

(b) Methane has a density of 0.717 g/mL , determine the mass of 50.0 mL of methane. Calculate the moles of methane present.

(c) Calculate the number of moles of ammonia present in 1.20×10^{24} molecules of ammonia.

(d) The methane and ammonia are reacted in the presence of oxygen. Determine the mass of hydrocyanic acid and water produced. Calculate the number of molecules of hydrocyanic acid produced. Determine the volume of water produced.

(e) Calculate the mass of oxygen required in the reaction. How many molecules of oxygen are required?

(f) What mass of the excess reactant is used in the reaction and what mass of the excess reactant remains after the reaction?

(g) Draw a Lewis Structure for each compound in the reaction. Classify the VSEPR shape of each molecule.